

THE LITTLE PIGMY POSSUM
Cercartetus lepidus
IN TASMANIA

by

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INTRODUCTION

The Little Pigmy Possum *Cercartetus lepidus* (Thomas, 1888) was described in "Catalogue of Marsupialia & Monotremata in the collections of the British Museum (Natural History)", having been previously overlooked because such specimens were believed to have been the young of *C. nanus*. The holotype is an alcohol preserved female (skull dried) with four hairless young, one of which has been removed from the pouch (in let. P. D. Jenkins). It was collected in Tasmania (no locality or date given) by Ronald Gunn and presented by him to the British Museum (Nat. Hist.) (Thomas, 1888, pp. 142-143). Wakefield (1963) states that the specimen reached the British Museum in 1852.

Though for many years believed to be confined to Tasmania, *C. lepidus* has now been collected from Kangaroo Island, South Australia (Aitken, 1967), from 46 km south of Pinnaroo, South Australia (Aitken, 1977) and from the Mallee in Victoria (Dixon, 1978). A once wider distribution is evidenced by the discovery of fossil remains in Late Pleistocene deposits from Broom Cave, Wombeyan Caves, eastern New South Wales (Ride, 1960) and sub-fossil deposits from the Pyramids, near Buchan, eastern Victoria (Wakefield, 1960).

Aitken (1974) describes the discovery in 1964 of its existence on Kangaroo Island and compares that population and the habitat in which it lives with the Tasmanian population and its preferred habitat. Turnbull & Sefton (1973) discuss the dental morphology of four species of the genus *Cercartetus* and conclude that the interspecific differences occurring amongst all the living species, as well as morphological variations within the Broom Cave material, strongly supports their being placed in four monotypic genera. However, they concede that a more extensive biological study to test their conclusions is desirable before further taxonomic changes are proposed. Ride (1970, 84-86) places all four within the one genus and Green (1973) follows his arrangement when dealing with the Tasmanian species. Measurements and descriptions of *C. lepidus* are given by Green (1973), Aitken (1974) and Dixon (1978).

Very little biological work has been undertaken on the Little Pigmy Possum. Skemp (1950) gives a popular account and photographs of a captive specimen. Hickman & Hickman (1960) give the results of a twenty-two months study of captives and include data on dormancy periods and diet. Wakefield (1963) summarises the data available to him from museum specimens and other sources, and Green (1973) gives brief notes on habitat preferences, activity, diet and breeding. The present observations are based upon material in the Queen Victoria Museum, Tasmanian Museum and animals kept in captivity for varying periods over the past 18 years.



Plate 1 A nest of *C. lepidus* found beneath a log at Patersonia on 30 September 1967. It was composed of fibrous bark from a *Eucalyptus* sp. and contained two young.



Plate 2 A pouch young of *C. lepidus* (1978/1/53) found at Greens Beach on 29 January 1978. The scale bars are at mm intervals.

TASMANIAN DISTRIBUTION AND HABITAT

The lack of knowledge about trapping *C. lepidus* has resulted in few specimens being collected and then usually by accidental discovery. Most specimens in collections were found by members of the public and taken to museums for identification and donation. This haphazard, opportunistic sampling (Fig. 1) suggests its distribution is restricted to the lowlands of the north, midlands and south. The pattern of distribution in the north follows closely that of the dry sclerophyll forest and woodland but in the south some have been collected in wet sclerophyll forest and sedge-land areas. No *C. lepidus* are known to have been found in rainforest and none have been found on the islands around Tasmania. In those areas, it is replaced by the larger *C. nanus* with a little overlap occurring in the wet sclerophyll.

The difficulty in separating sub-adult *C. nanus* from *C. lepidus* has often caused confusion and led to mistaken identifications. Unless otherwise stated, only specimens examined by the author and identified as *C. lepidus* on the criterion of a fourth molar tooth have been included in the distribution map (Fig. 1). The distribution given by Wakefield (1963) includes Bruny Island. This record was probably based on a spirit preserved specimen in the Tasmanian Museum, labelled as *C. lepidus* but which is actually *C. nanus*.

The occurrence of *C. nanus* on Flinders Island (Green 1969) and on King Island (Green & McGarvie 1971), to the exclusion of *C. lepidus*, is consistent with the general pattern of animal distribution. Though the islands presently support a dry habitat, the fauna has a general bias to those species occurring in rainforest and wet sclerophyll (Green 1969, Green & McGarvie 1971).

NESTING SITES AND NESTS

Nests and sleeping places of *C. lepidus* are usually close to the ground and often appear to be of a temporary nature. Sites from which it has been collected are beneath overturned turf on ploughed ground, inside decayed logs and stumps, in a small hole in a green tree, amongst the dead needles of a she oak *Casuarina* sp. which had accumulated in twigs about two metres above the ground, in an old nest of a New Holland Honeyeater *Phylidonyris novaehollandiae* situated about one metre above ground in dense tea tree scrub, in wall cavities of buildings, in a canvas shower bucket hanging in an outbuilding and amongst old clothes in a shed. In some of these sites, such as that amongst the she oak needles, in the bird's nest, in the hole in the green tree and amongst the old clothes, no nesting material had been gathered and they appeared to be of very temporary usage. The possum found in the bird's nest was a female with four pouch young. The nest was cup shaped and the sleeping possum was sheltered only by the tea tree foliage two metres above. Chaffer (1930) records *C. nanus* nesting in an old nest of *P. novaehollandiae*. Some found asleep in small cavities inside decayed logs have also been without nesting material. Such sites appear to have been used by nomadic individuals without a permanent nest.

Established nests have usually been found to be occupied by two adults. One nest was found to contain two juveniles but the adults and other juveniles may have escaped unnoticed.

Nests examined were found to be composed of strips of fibrous bark. One collected from inside a canvas shower bucket at Greens Beach was merely a lining of small ribbon-like pieces of bark from tea trees. The nearest such trees were about 20 m distant, the possums travelling to and fro along a wire clothes line stretched between the tea trees and the shed in which the bucket hung. Another (plate 1), collected from beneath a log at Patersonia and containing two juveniles, was a bulky structure in the form of a hollow ball about 10 cm in diameter and composed of bark fibre from *Eucalyptus* sp., much of which had been shredded down to the size of horse hair. A hole in a she oak *Casuarina* sp. near Bridport, from which a single adult had been collected, was found to contain only a few small strands of dry grass matted together by spider webs.



Plate 3 Two young of *C. lepidus* (1975/1/10) with a captive female, not their mother. The young cling tenaciously to the dorsal fur.



Plate 4 An adult *C. lepidus* feeding on a Metallic Skink *Leiolopisma metallica* while holding the lizard in its front feet.

BREEDING AND DEVELOPMENT

Seven sets of alcohol-preserved pouch young are listed in Table 1. Six of these are in the Queen Victoria Museum, collected from localities in central northern Tasmania, and one in the Tasmanian Museum was collected in the south of Tasmania. The following details taken from those specimens are given in ascending order of body size.

Reg. no. 1962/1/4. When cultivating a ploughed paddock on 16th January 1962, two adult *C. lepidus* were disturbed from a nest formed beneath overturned turf. One was caught and passed on to the author the following day. It was found to be a female with noticeable distensions either side of the pouch opening. It was kept in a box and fed on honey and insects but died on 26th January. Upon examination, the pouch was found to contain four young of a mean body weight of 115 mg. They were hairless, the skin being a uniform pale flesh pink and the eyes appearing only as dark rings on the side of the head. The lips at the sides of the mouth were sealed. The front feet were strongly developed and the toes equipped with prominent claws. Sexing was not practicable without risk of damaging the specimens. It is probable that they were born before the female was captured and would therefore be at least ten days old.

Reg. no. 1978/1/53. An adult female, found asleep but not dormant, in the cup-shaped nest of a New Holland Honeyeater on 29th January was carrying four pouch young. In an attempt to rear the young, she was housed in a glass fronted box with sawdust on the floor and equipped with a small nest box in a corner. Syrup, as described later (see "Food") and water were provided. The young were completely enveloped by the pouch and carried in lateral pocket-like expansions formed either side of the opening. Both the female and young were disturbed as little as possible and placed in the nest box on the evening of 29th January.

Upon inspection at 9 a.m. on 30th January, the female was found to be in a dormant state and the four young cast out on the floor of the cage. They were all alive though cold and sluggish and when held in the warmth of cupped hands showed signs of increasing activity. While still dormant the female was held belly uppermost and one of the young placed near the pouch opening. With a little assistance, it was able to re-enter the pouch. The remaining three young were then placed in a cupped hand with the female resting in a normal crouched position on top of them. Within 20 minutes, they had become active and had re-entered the pouch without assistance. By this time, the female had returned to an active state and remained so all day without discarding the young.

At 7 a.m. on 31st January, it was found that food and water had been consumed overnight. The female was in the nest box in a dormant state with all the young still in the pouch. She remained undisturbed and dormant throughout the day.

On the morning of 1st February, it was again found that food and water had been consumed overnight and the female was again dormant but one young had been discarded from the pouch. It was still alive though cold and sluggish but soon became active when warmed in cupped hands. Its body weight was 1000 mg, the dorsal skin dark grey and the ventral skin a pale flesh pink. Under microscopic examination, it was found that dorsal and facial hairs had erupted but ventral hair and vibrissae were not noticeable. The eyes were still closed but the form of the eyelids was obvious. The lips at the sides of the mouth were free and the jaw had full freedom of movement. The ears were still closed. The hind feet were developed equal to the front feet and the claws of both had become elongated. The manus was continually being flexed as if trying to grip. No teeth had erupted. It periodically uttered a series of rapidly repeated low hissing sounds as if distressed or aggravated and it crawled about as if searching for its mother. No attempt was made to return it to the pouch and it was left on the floor of the box near the nest opening after being photographed (plate 2).

At 8.40 a.m. on 2nd February, the young was still on the floor of the box, alive but in a dormant state. Food and water had been taken overnight, two more young had been discarded and the female was found in the nest in a dormant condition.

The first discarded young was then preserved and the second two placed in the nest beneath the female.

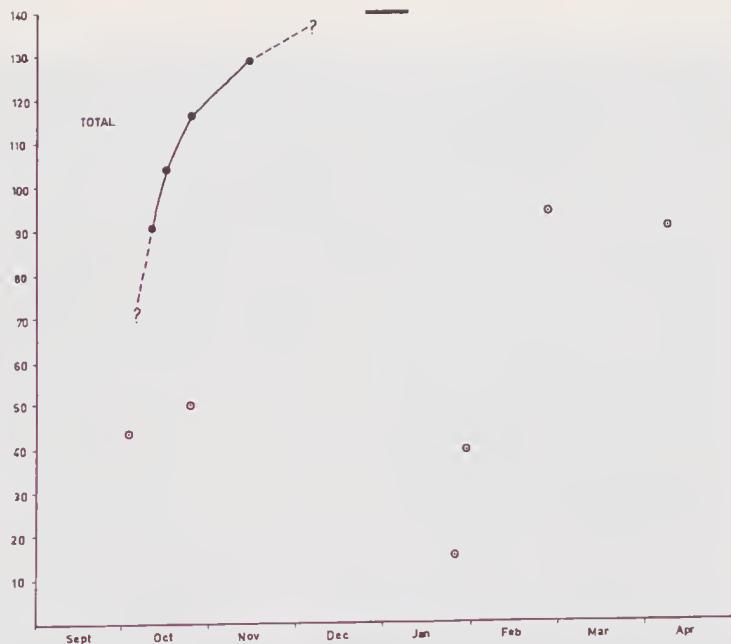


Fig. 2 The mean total length in mm of two young *C. lepidus* (1975/1/9 and 10) measured on four dates between 11 October and 14 November. The mean total length of adults is indicated ———. The total lengths and dates of collection of six additional sets of young are plotted ○.

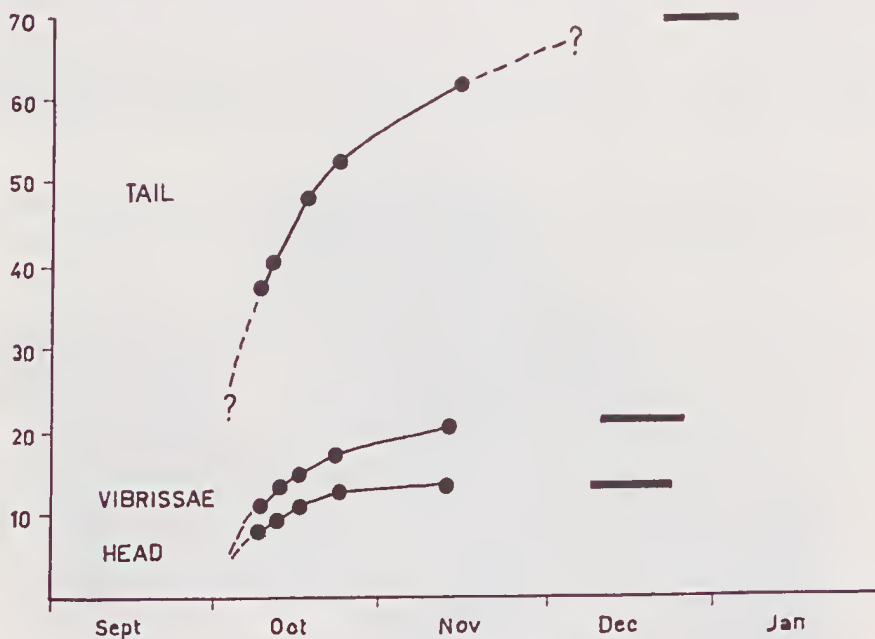


Fig. 3 The mean lengths in mm of tail, mystacial vibrissae and head of two young *C. lepidus* (1975/1/9 and 10) measured on five dates between 9 October and 14 November. The mean of adults is indicated ———.

On the morning of the 3rd February, all three remaining young were found discarded, dead on the floor of the box. It was not known if the young had been able to secure a nipple and feed when returned to the pouch but a body weight of 870 mg of the last discarded individuals, weighed on 3rd February, compared to 1000 mg of that weighed two days previously, suggests a loss possibly due to starvation.

Reg. no. 17754/A55, a set of three in the Tasmanian Museum, was collected at Craddock on 3rd October, 1960. The dorsal fur had just erupted, mystacial vibrissae were to 3 mm and the ears sealed. The eyes were closed and appeared as dark rings and the lips at the sides of the mouth were free. No teeth had erupted.

Reg. no. 1965/1/134. A single specimen, said to have been from a set of three pouch young taken from a female caught in north-eastern Tasmania on 4th October, was presented to the Queen Victoria Museum on 4th May. It had been preserved in alcohol and no other details had been recorded.

Dorsal fur had grown to 0.5 mm and ventral fur had just erupted. Mystacial vibrissae had grown to 8 mm. The eyes were still closed but the ears were open and the lower incisors had erupted.

Reg. no. 1975/1/9 & 10. Two juveniles were found in a nest on the ground beneath a log at Patersonia on 30th September. They were brought to the Queen Victoria Museum on 4th October and were subsequently reared on the prepared diet described later (see "Food"). Measurements of development were recorded at intervals over a period of 34 days. These are plotted in Figs. 2 and 3. When passed to the Museum, the dorsal fur was to 3 mm long, mystacial vibrissae to 9 mm and ears 9 mm. Placed with a captive female *C. lepidus* (not their mother) they clung tenaciously to her dorsal fur and she showed neither intolerance nor maternal response (plate 3).

Reg. no. 1973/1/11. A juvenile collected at Golconda on 8th April had dorsal fur to 7 mm and mystacial vibrissae to 15 mm. The ears were 10 mm and most teeth had erupted.

Reg. no. 1978/1/229. A female and four young (2 male and 2 female) outside the pouch were caught at Deddington on 25th February and kept as pets until death on 25th March. They were then presented to the Queen Victoria Museum. The pouch opening of the adult was elongated, about 10 mm from front to rear and about 5 mm across. The lateral pouch pockets were about 5 mm deep and the nipples were about 3 mm long. The young had dorsal fur to 8 mm long and mystacial vibrissae to 16 mm. The ears were 11 mm and a full set of teeth had erupted in both jaws.

It is accepted that the present data is too sparse to provide definite evidence of seasonal breeding and rate of development. Newly born young are undescribed and age determination of pouch young is not yet possible with reasonable accuracy. However, when the dates of collection and size of the young in the samples are plotted (Figs. 2 and 3), the pattern suggests that *C. lepidus* probably gives birth in the spring or summer months and the young are independent of the pouch by May. The two specimens discussed by Hickman & Hickman (1960) were an adult female without young, collected on 28th April, and an immature female little more than half grown, collected on 12th December. Hickman & Hickman (1960) show that the longest periods of activity in captive animals occurred between September and March. All these data corroborate the breeding times indicated in Figs. 2 and 3.

FOOD

Animals kept in captivity have provided almost all that is known of the diet of *C. lepidus*. Scott (1920) found captives to be fond of the flesh of apple but they disregarded the skin. Hickman & Hickman (1960) found their captives to feed on insects, spiders and small lizards and the weight of food consumed each day during periods of activity to be about seven percent of body weight. They also provided an artificial food on which the animals thrived. It consisted of lightly baked biscuits made from a mixture of self-raising flour (350 g), cornflour (70 g), cane sugar (220 g), salt (1.5 g), milk (20 ml) and one egg.

The present author found *C. lepidus* to readily take a wide range of insects, spiders and small lizards of the genus *Leiopisma*, securing the prey with its front feet while consuming the pieces (plate 4). It was found to have a fondness for honey and sweet liquids and an artificial supplement which was always available to the animals was made up. This consisted of honey (300 g), sweetened condensed milk (25 g), meat extract (10 gm), and multi-vitamin (2 ml), mixed together with an equal quantity of water to form a syrup. Stock in refrigeration kept fresh for several weeks but when set out in hot weather it fermented and became rancid in a day or so. *C. lepidus*, as well as other species of mammals and birds, has been found to thrive on this supplement but it was sometimes necessary to limit its availability in order to prevent the animals accumulating excessive fat deposits.

In its wild state, *C. lepidus* probably feeds primarily on insects and spiders but its demonstrated fondness for sweet substances suggests that it probably takes nectar when available as well.

ACTIVITY AND DORMANCY

Hickman & Hickman (1960) kept daily records of activity and dormancy for twelve months and found that periods of activity alternated with periods of dormancy throughout the year and that no long hibernations occur, though periods of activity are much longer during the months from September to March than from April to August. The factors which stimulate activity and produce dormancy are unclear and Hickman & Hickman (1960) were unable to find a direct correlation between air temperature and the activity or dormancy of animals.

An adult with four pouch young, captured asleep but not dormant and kept in an empty wooden box overnight, was found to be dormant next morning. No long term records of active and dormant periods have been kept by the present author but observations have shown that, during the winter months, *C. lepidus* is often dormant in the day but becomes active at night as was demonstrated by the taking of food and water. During the summer months, it was often found to be active in the day but rarely was it seen to leave the seclusion of its nest in daylight. Abnormal physical disturbance may also arouse activity but a need to feed seems the most likely stimulant.

PARASITES

Ectoparasites have been collected from the pelage of *C. lepidus* at every opportunity and the following have been identified.

ACARI (mites and ticks)

DERMANYSSIDAE (det. R. Domrow)
Andreacarus radfordi Domrow, 1963

ARGASIDAE (det. F. H. S. Roberts)
Ixodes tasmani Newmann, 1899

SIPHONAPTERA (fleas)

PYGIOPSYLLIDAE (det. G. P. Holland, D. Mardon)
Acanthopsylla scintilla tasmanica Holland, 1971
Choristopsylla ochi (Roths., 1904)

NATURAL ENEMIES AND HABITAT ALTERATION

There is no direct evidence of predatory pressure on *C. lepidus* but its habitat and mode of living make it vulnerable to some carnivorous predators. These include the feral cat *Felis catus* and Quoll *Dasyurus viverrinus*, both of which live in the areas where *C. lepidus* occurs. The Tiger Cat *Dasyurus maculatus*, though primarily occurring in rainforest and wet sclerophyll forest, occasionally enters adjacent dry sclerophyll forest and would be a potential predator. The small dasyurids do not generally occur in areas where *C. lepidus* lives and are therefore not a threat.

The diurnal seclusion of *C. lepidus* probably protects it from the diurnal birds of prey but it is no doubt susceptible to the attacks of the nocturnally active Masked Owl *Tyto novaehollandiae* and Southern Boobook *Ninox novaeseelandiae*, both of which eat small mammals. The Tiger Snake *Notechis ater* and Copperhead Snake *Astrelops superba* also eat small mammals and probably include *C. lepidus* in their diet.

Man's fascination for this tiny marsupial also results in some mortalities when it is accidentally found, captured and kept as a pet, the unfortunate result of which is usually death from malnutrition due to incorrect diet and housing. Bush fires must also take a toll though this is probably no greater now than before European settlement.

The greatest destruction of the *C. lepidus* population was probably caused by the arrival of European man and his cutting and clearing of the forests to create grazing land for domestic stock. This occurred largely in the south-east, midlands and north of the island where dry sclerophyll forest and woodland has been cleared and replaced by extensive areas of open grassland and intensive farming. The present pattern of distribution of *C. lepidus* suggests that a once continuous and unbroken population extended from the south-east to the north coast but which has since been fragmented and broken by the removal of much of its required habitat and the establishment of grassland barriers.

Unlike the larger marsupials which may travel over a relatively wide range, the movements of *C. lepidus* must, because of its diminutive size, be very localised. Its need to remain within the shelter of its habitat, so the better to avoid the sudden attacks of predators, prevents it venturing onto grassland to feed as do the larger grazing, carnivorous and insectivorous marsupials which thereby derive some benefits from patches of pasture improvement.

Though it is able to withstand the predatory activities of its natural enemies, it is unable to adapt to or in any way benefit from the extensive land clearing activities. Until recently, such activities have been in general restricted to the limits of those areas suited to pasture establishment, while still leaving extensive areas of forest not immediately profitable to clear. The recent handsome financial returns for wood-chips has stimulated timber harvesting on a scale not previously reached in scope or intensity. This now creates a further threat to the remaining areas of *C. lepidus* habitat and which, with the continuing demand for more grazing and agricultural development must deplete even more the range of this marsupial.

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TABLE 1 Young of *C. lepidus* in the Queen Victoria Museum and young of the holotype in the British Museum (Nat. Hist.).

* estimated

Registered number	Number in set	Length (mm)				Date	Locality
		Total	Tail	Head	Crown rump		
1962/1/4	4	15*	4	5.5	9	26.i.62	Greens Beach
1978/1/53	4	40	10	11.5	17	29.i.78	Greens Beach
17754/A55	3	44	20	11.5	20	3.x.60	Craddock
1965/1/134	3	51	31	12	24	24.x.64	North-east Tas.
1975/1/9&10	2	90	40	?	—	11.x.67	Patersonia
1973/1/11	1	90	49	17	—	8.iv.73	Golconda
1978/1/299	4	94	50	17.5	—	25.ii.75	Deddington
Holotype	4	28	6.5	7	—	N/D	Tasmania